



Using SytemLink to Manage LabVIEW and TestStand Deployments



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Abstract

Deployment to run-time environments is why developers have used build specifications for a long time. One challenge that arises is the *actual delivery* of the installer as its size occupies ~1GB.

This presentation demonstrates how we can use the Package build specification and include dependencies to create small packages for NI Package Manager, and even publish them to a SystemLink Server Feed for SystemLink client deployment for both LabVIEW and TestStand systems. SystemLink then will have awareness of all the deployed systems and their configurations.



Overview/Agenda

- Traditional Deployment Strategies
 - LabVIEW
 - TestStand Core
 - TestStand Client Sequence
- New LabVIEW Strategy
- New TestStand Strategy
- Delivery
- SystemLink Server
- SystemLink Client
- Security
- Bonus Topic – Replicating Development Machines

To Defy The Laws Of Tradition

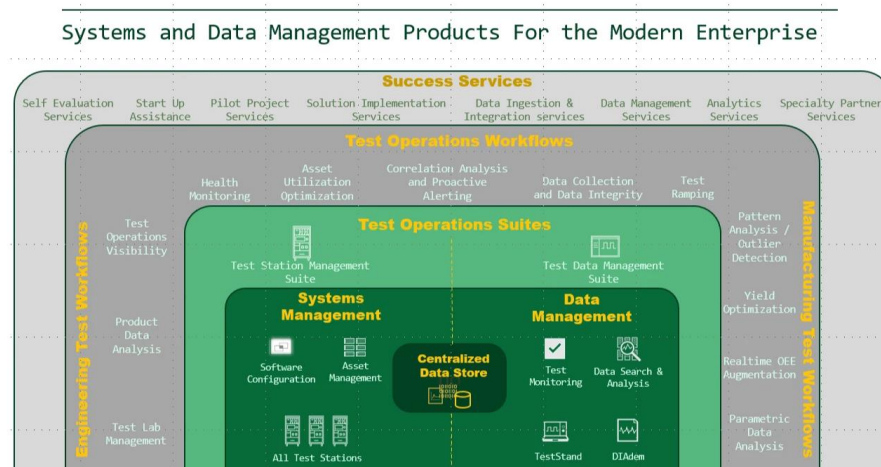


- Build the Executable
- Build the Installer
- Zip and deliver the installer (~1GB in many cases)
- ftp, http, USB Drive, etc.

SystemLink Overview - NI Definition

Connecting People, Process, and Technology

SystemLink is an intelligent Systems and Data Management environment that breaks down silos in your organization—from concept to manufacturing. Designed for engineering use cases, SystemLink software combines focused applications and data services that accelerate time-to-knowledge and time-to-market by leveraging comprehensive real-time information. From engineering teams to enterprises, SystemLink software helps you achieve peak performance.



Traditional LabVIEW Strategy Executable

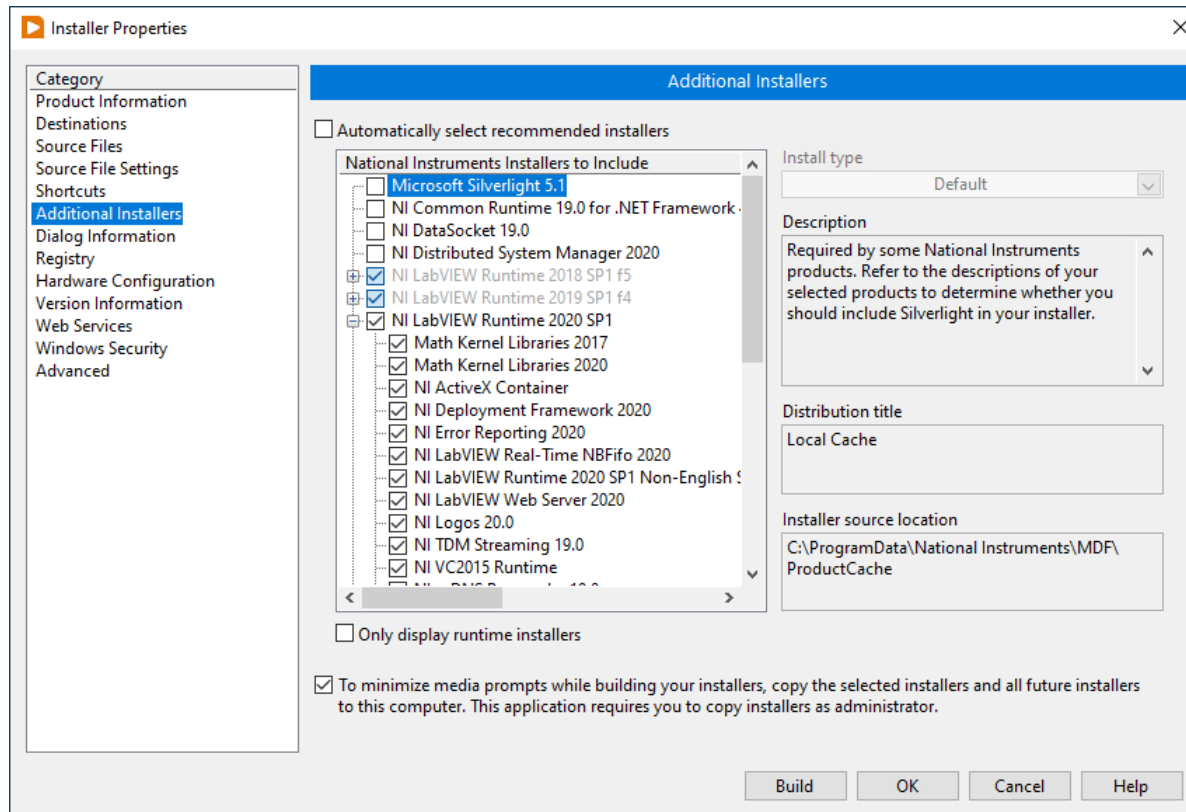
The screenshot shows the 'Executable Properties' dialog box with the 'Version Information' tab selected. The left sidebar lists various categories, with 'Version Information' highlighted. The main area contains fields for versioning and product details.

Version Information			
Version			
3	2	0	0
<input type="checkbox"/> Auto-increment version on build			
Product name			
Gas Test System			
Legal copyright			
Copyright © 2012			
Company name			
Molecular Products			
Internal name			
Gas Test System			
Description			

Buttons at the bottom: Build, OK, Cancel, Help

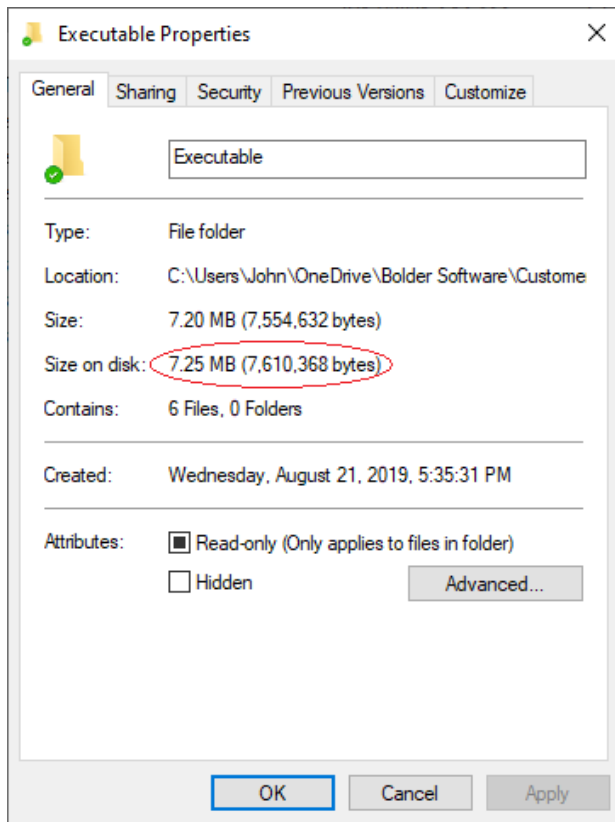
Executable Build Specification

Traditional LabVIEW Strategy Installer

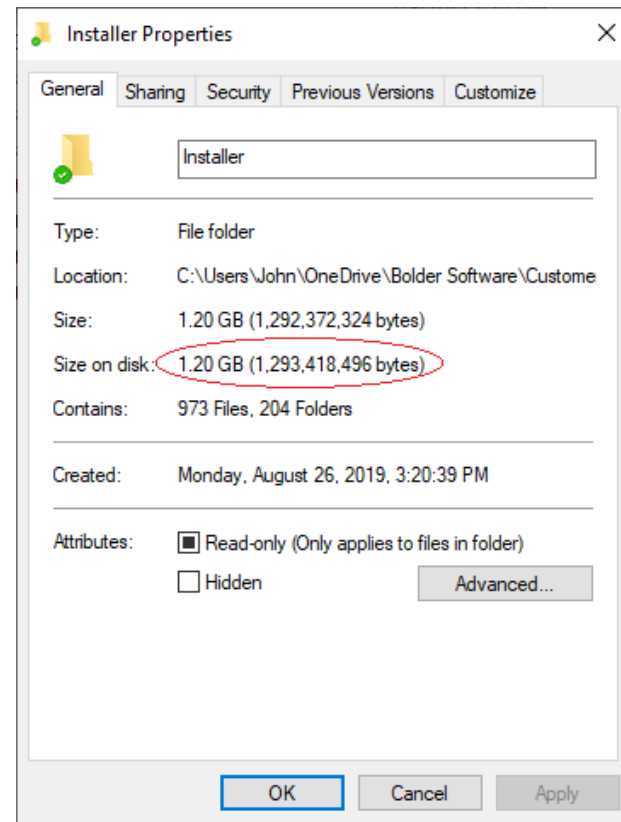


Installer Build Specification

Traditional LabVIEW Strategy Sizes



Executable Size

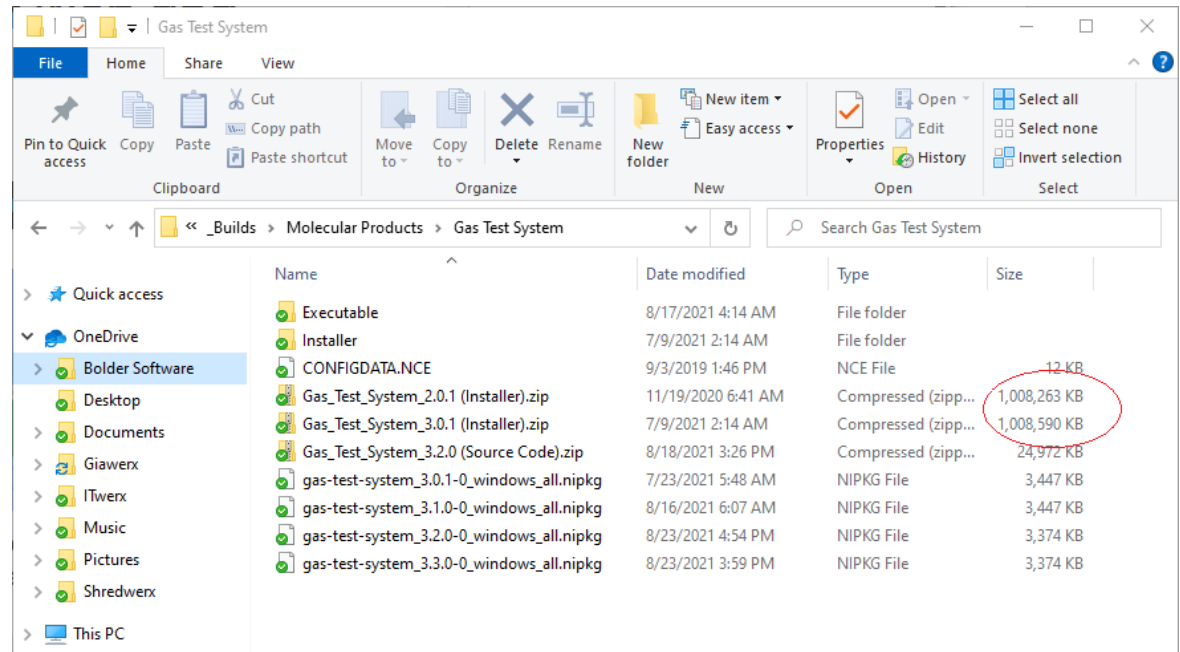


Installer Size

Traditional LabVIEW Strategy

Version Sizes

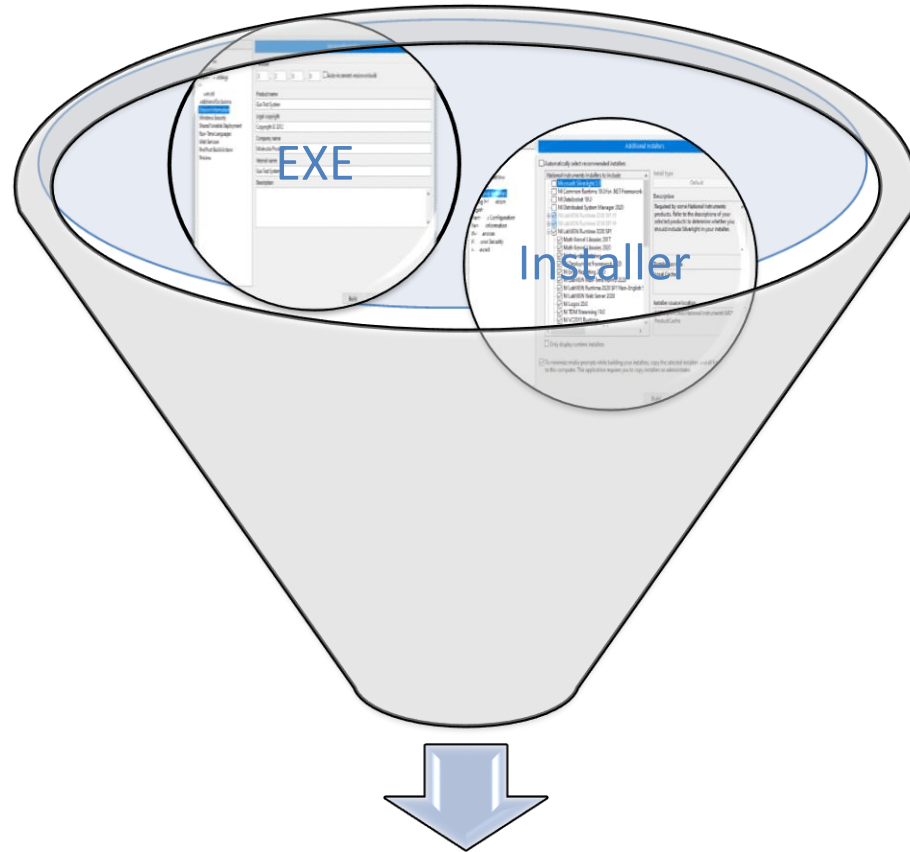
Those are
big files!



Name	Date modified	Type	Size
Executable	8/17/2021 4:14 AM	File folder	
Installer	7/9/2021 2:14 AM	File folder	
CONFIGDATA.NCE	9/3/2019 1:46 PM	NCE File	12 KB
Gas_Test_System_2.0.1 (Installer).zip	11/19/2020 6:41 AM	Compressed (zipp...	1,008,263 KB
Gas_Test_System_3.0.1 (Installer).zip	7/9/2021 2:14 AM	Compressed (zipp...	1,008,590 KB
Gas_Test_System_3.2.0 (Source Code).zip	8/18/2021 3:26 PM	Compressed (zipp...	24,972 KB
gas-test-system_3.0.1-0_windows_all.nipkg	7/23/2021 5:48 AM	NIPKG File	3,447 KB
gas-test-system_3.1.0-0_windows_all.nipkg	8/16/2021 6:07 AM	NIPKG File	3,447 KB
gas-test-system_3.2.0-0_windows_all.nipkg	8/23/2021 4:54 PM	NIPKG File	3,374 KB
gas-test-system_3.3.0-0_windows_all.nipkg	8/23/2021 3:59 PM	NIPKG File	3,374 KB

Zipped Sizes

Traditional LabVIEW Strategy Summary

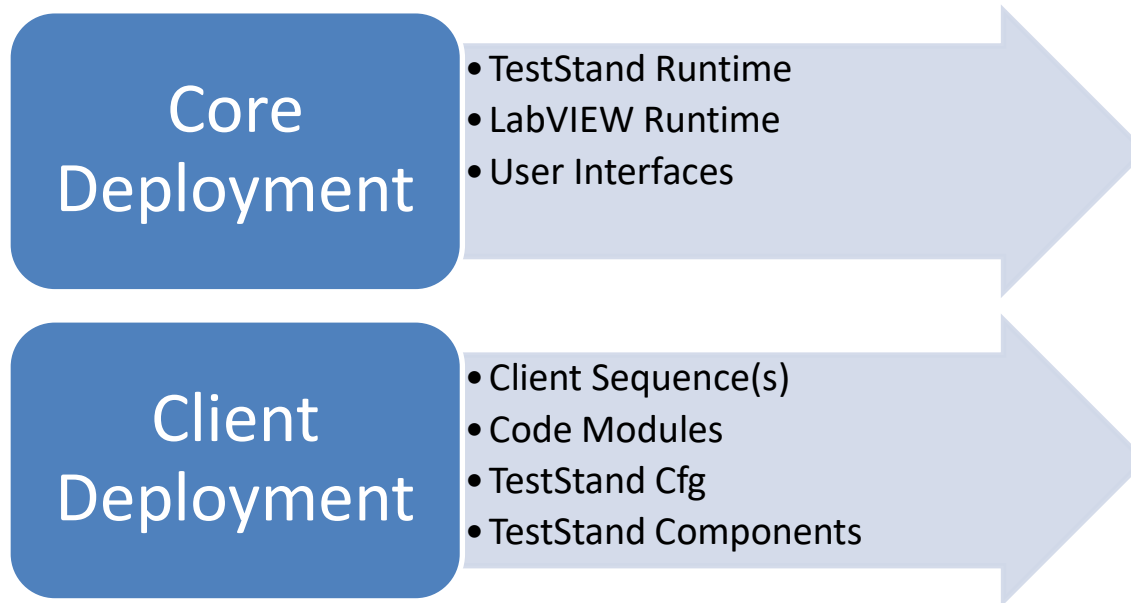


Installer (Zipped = ~1GB)

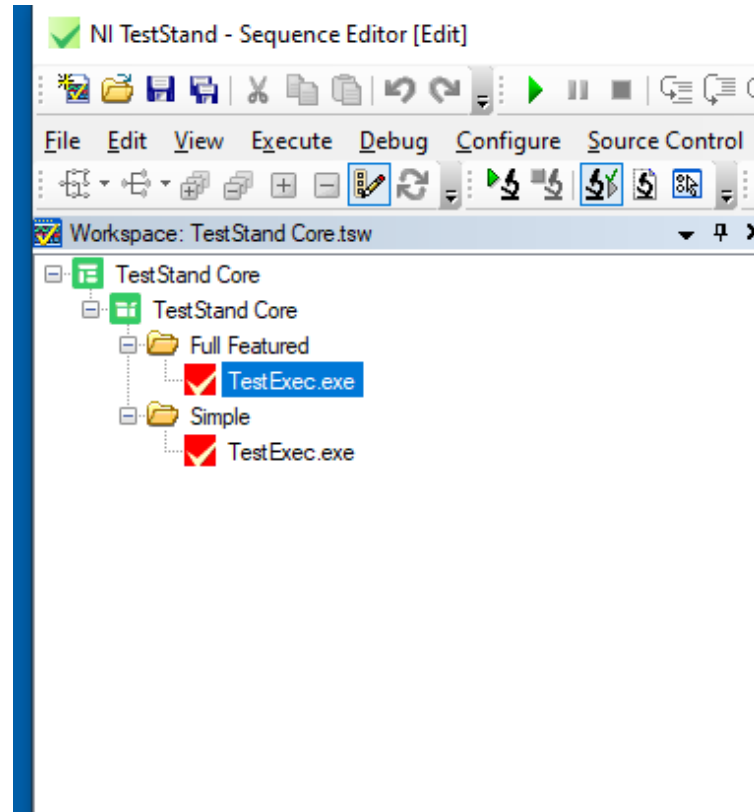
Traditional TestStand Strategy

2 Deployments

Create 2 deployments for easier upgradability. One large, fairly static deployment for Runtime, etc., and another for the client sequences and tests.

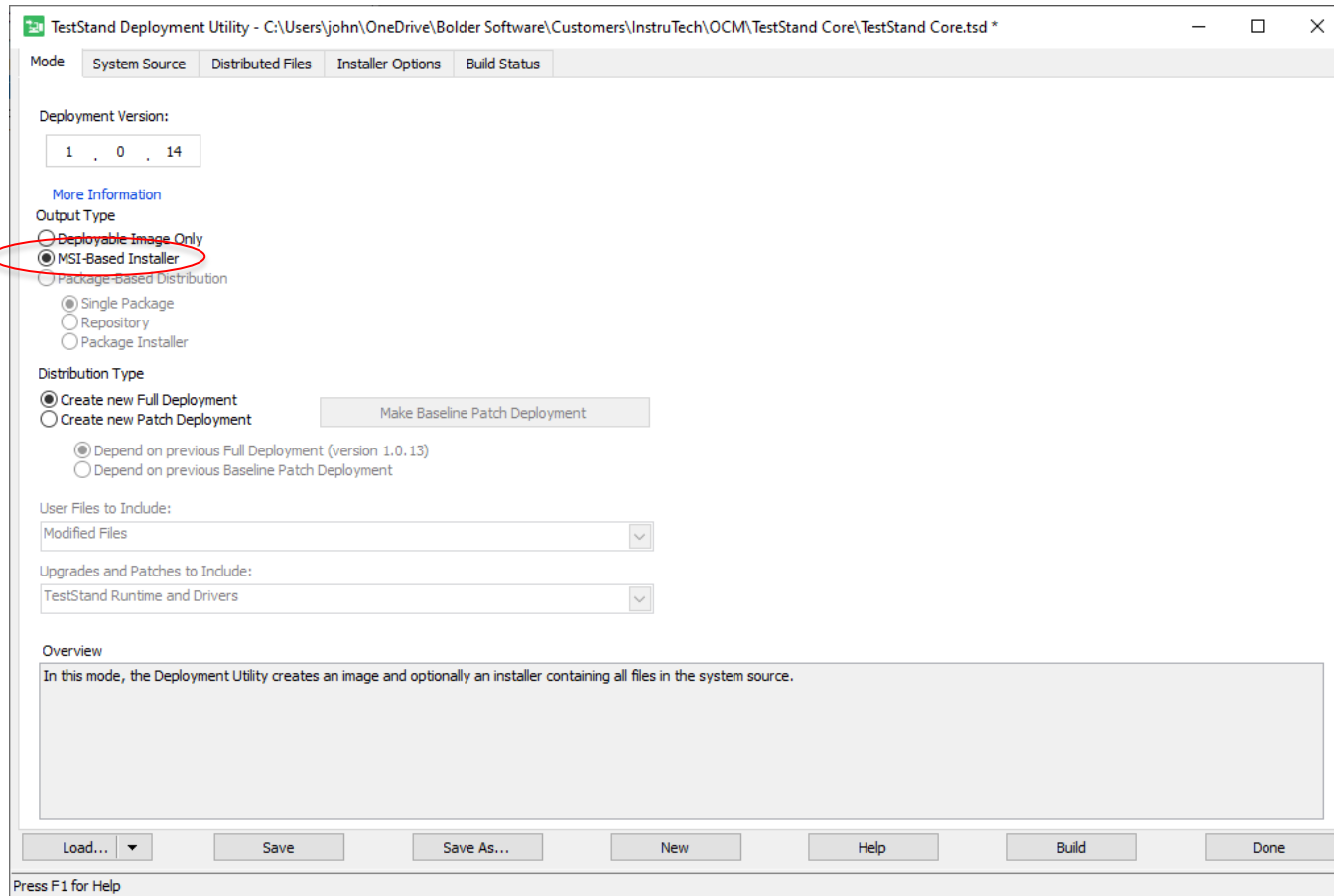


Traditional TestStand Strategy Core Workspace



TestStand Core Workspace

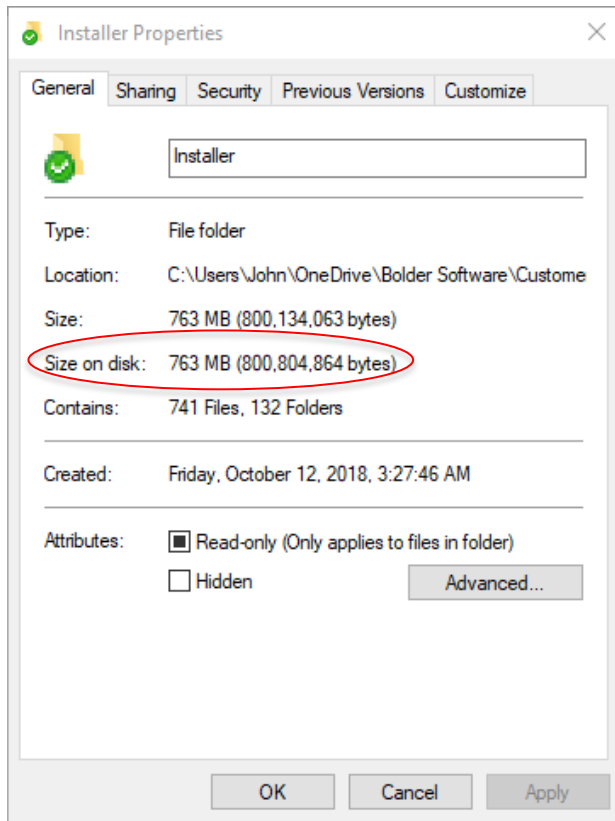
Traditional TestStand Strategy Installer



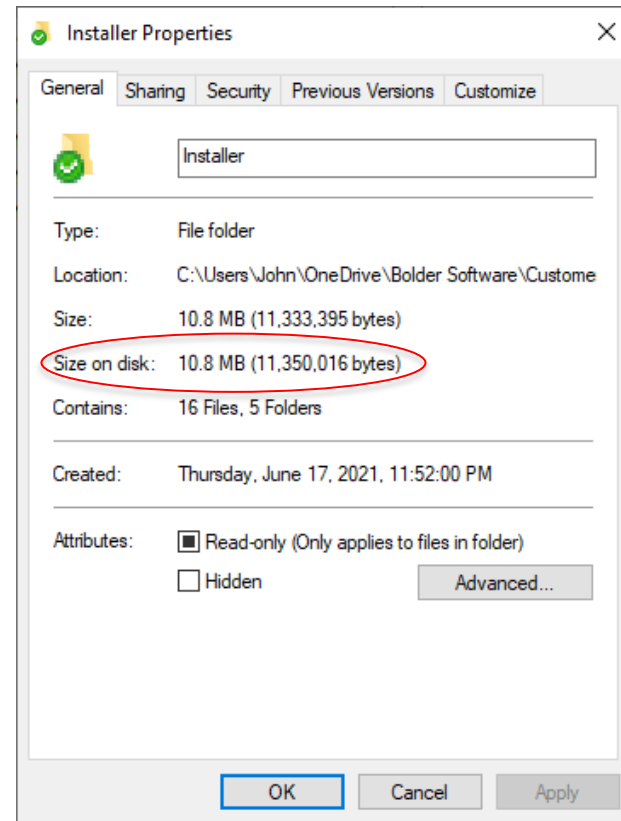
TestStand Core Workspace

Traditional TestStand Strategy

Deployment Sizes

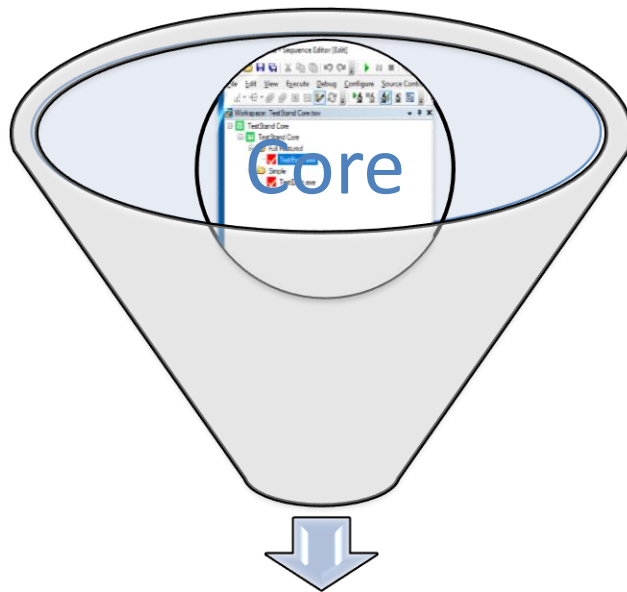


Core Deployment Size

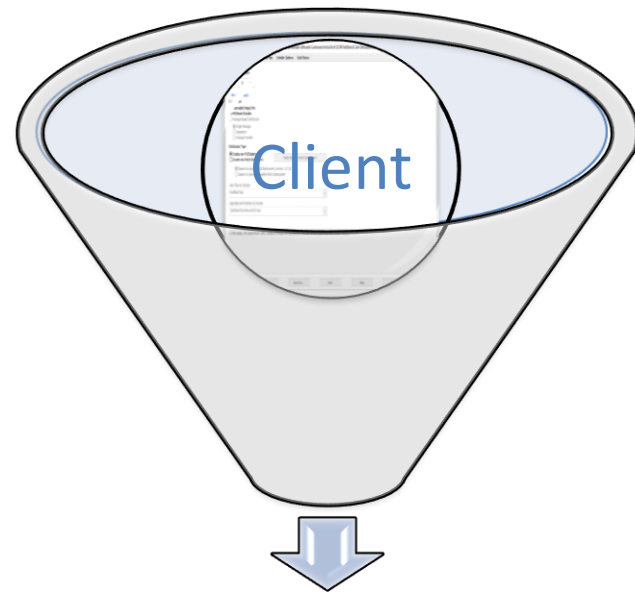


Client Deployment Size

Traditional TestStand Strategy Summary

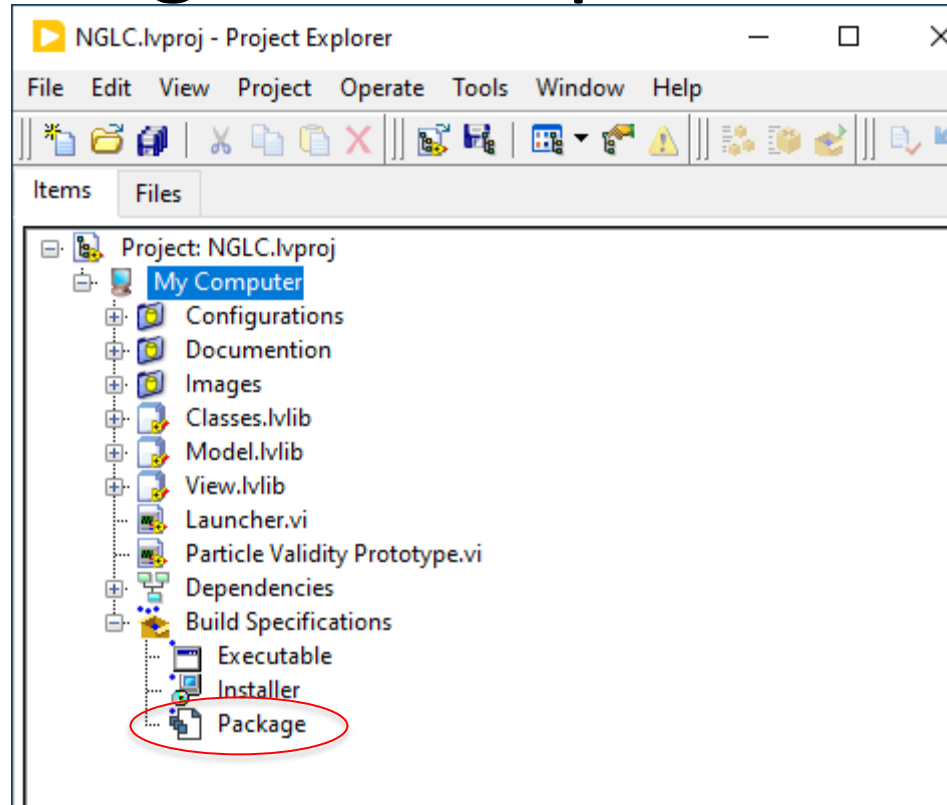


Installer (Zipped = ~1GB)



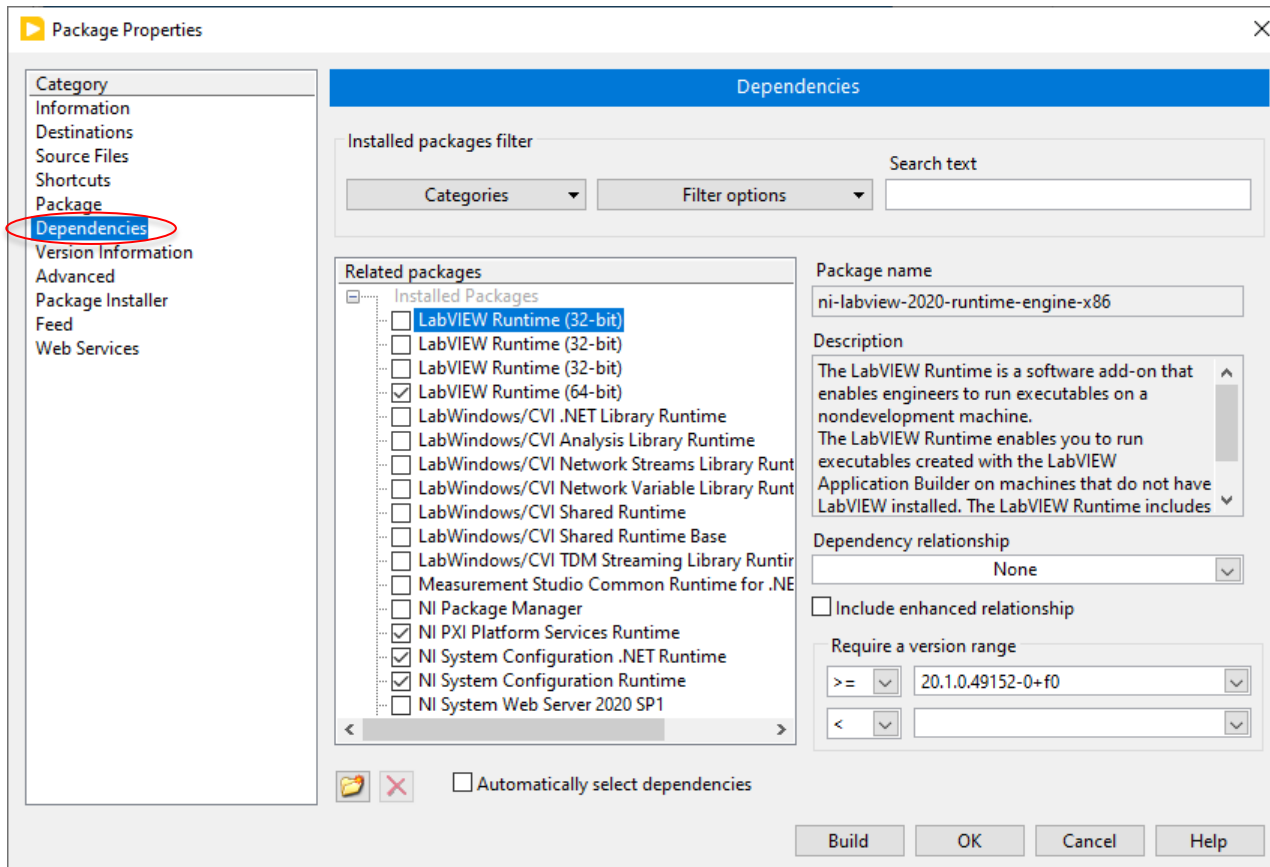
Installer (Zipped = ~10-20MB)

New LabVIEW Strategy Package Build Specification



Build Specifications

New LabVIEW Strategy Package Dependencies



Build Specification - Package Dependencies

New LabVIEW Strategy Package Feed

Package Properties

Category

- Information
- Destinations
- Source Files
- Shortcuts
- Package
- Dependencies
- Version Information
- Advanced
- Package Installer
- Feed**
- Web Services

Feed

☒ Add to feed

☐ Include all dependencies in feed

Feed location

C:\Users\john\OneDrive\Bolder Software\Customers\Particle Measuring Systems\Product Software\builds\NGLC\Package\Feed

☐ Append package version to feed location

C:\Users\john\OneDrive\Bolder Software\Customers\Particle Measuring Systems\Product Software\builds\NGLC\Package\Feed\2.4.0-0

☒ Publish to SystemLink feed

☐ Include all dependencies in SystemLink feed

Hostname

https://systemlink.boldersoftware.com

Test Connection Status

Username

Password

Feed name

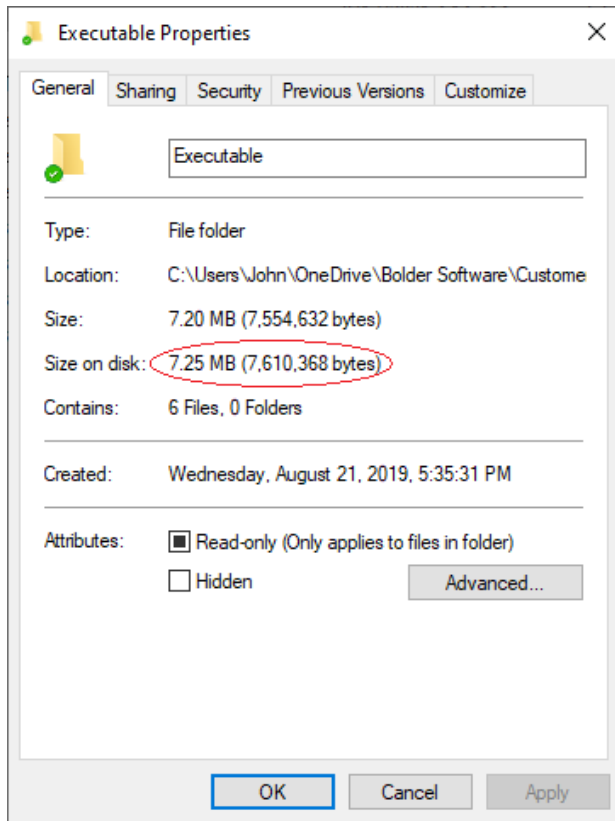
Particle Measuring Systems - NGLC

Feed description

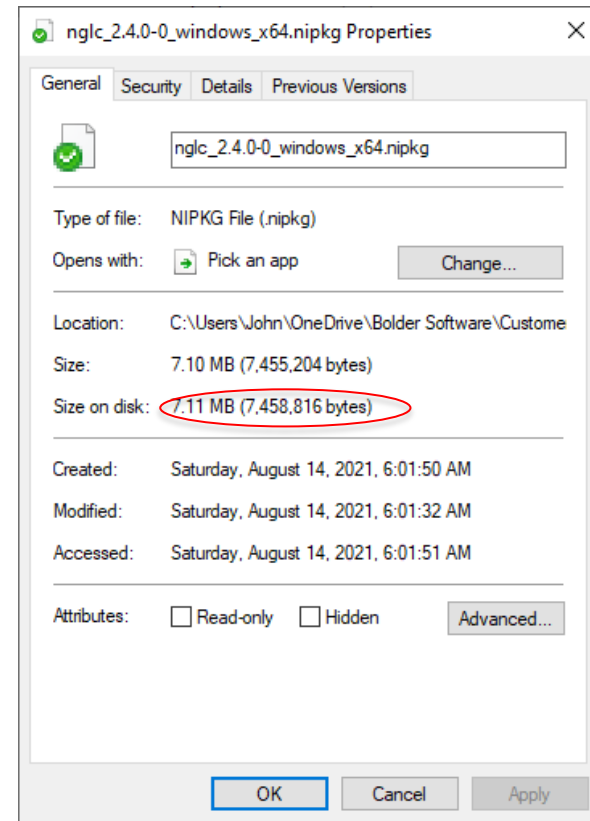
Build **OK** **Cancel** **Help**

Build Specification - Package Feed

New LabVIEW Strategy Sizes



Executable Size



Package Size

New TestStand Strategy Package

TestStand Deployment Utility - New Deployment *

Mode: System Source | Distributed Files | **Package Distribution Options** | Build Status

Deployment Version: 1 . 0 . 0 . 0

[More Information](#)

Output Type

- ☐ Deployable Image Only
- ☐ **MST-Based Installer**
- ☒ **Package-Based Distribution**
- ☒ Single Package
- ☐ Repository
- ☐ Package Installer

Distribution Type

- ☒ Create new Full Deployment
- ☐ Create new Patch Deployment

[Make Baseline Patch Deployment](#)

- ☒ Depend on previous Full Deployment (version 1.0.0)
- ☐ Depend on previous Baseline Patch Deployment

User Files to Include: Modified Files

Upgrades and Patches to Include: TestStand Runtime and Drivers

Overview

In this mode, the Deployment Utility creates an image and optionally an installer containing all files in the system source.

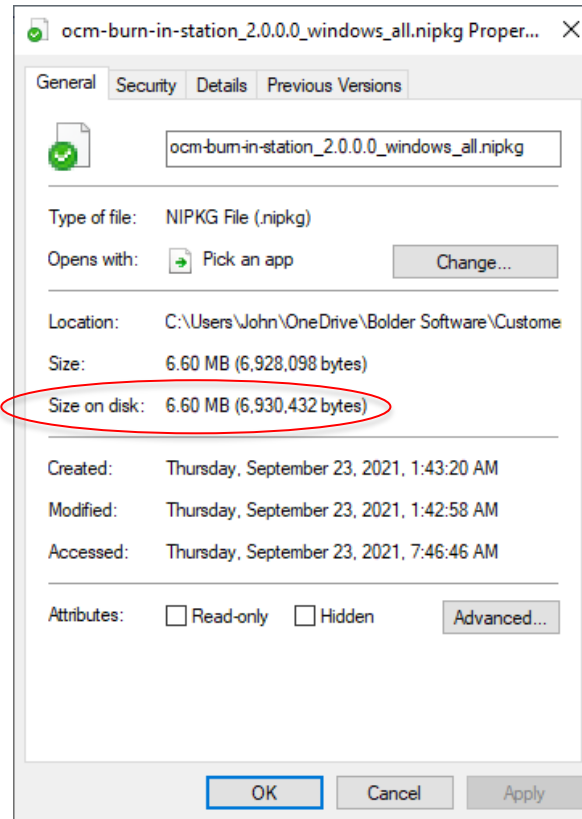
Load... Save Save As... New Help Build Done

Press F1 for Help

Build Specification - Package Feed

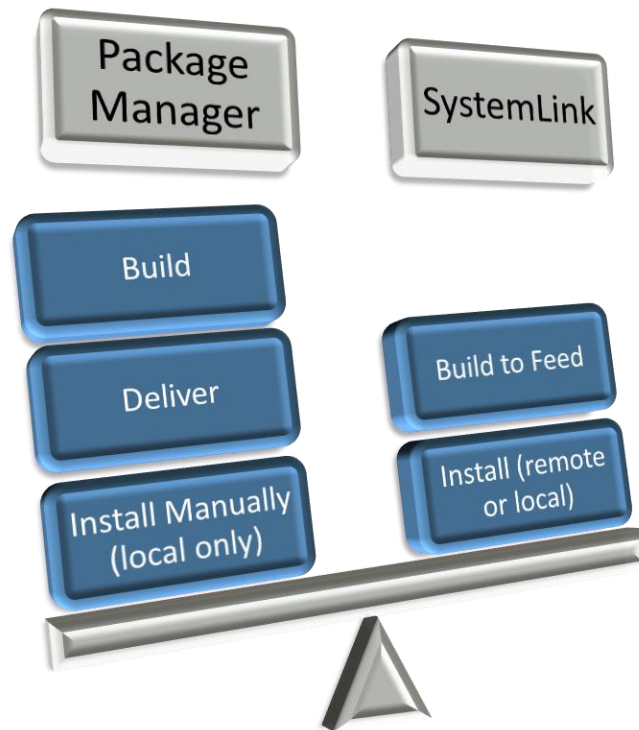
New TestStand Strategy

Package Size

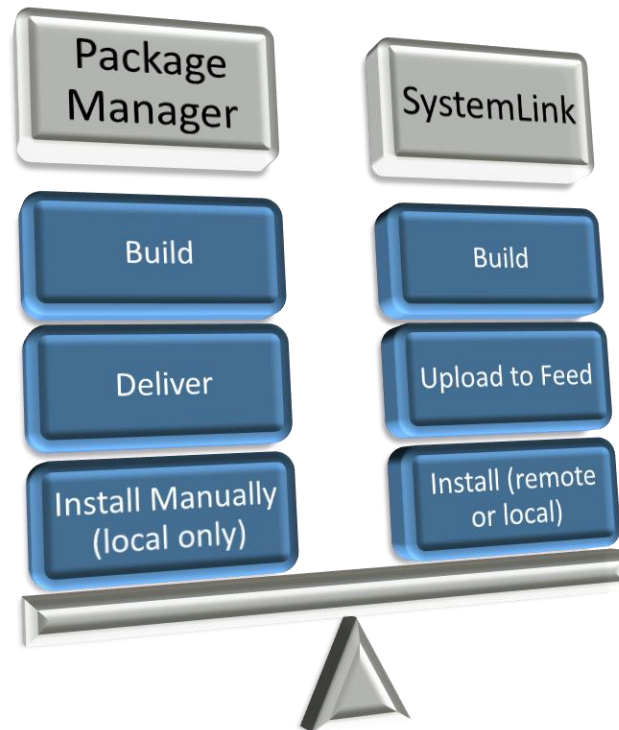


Package Size

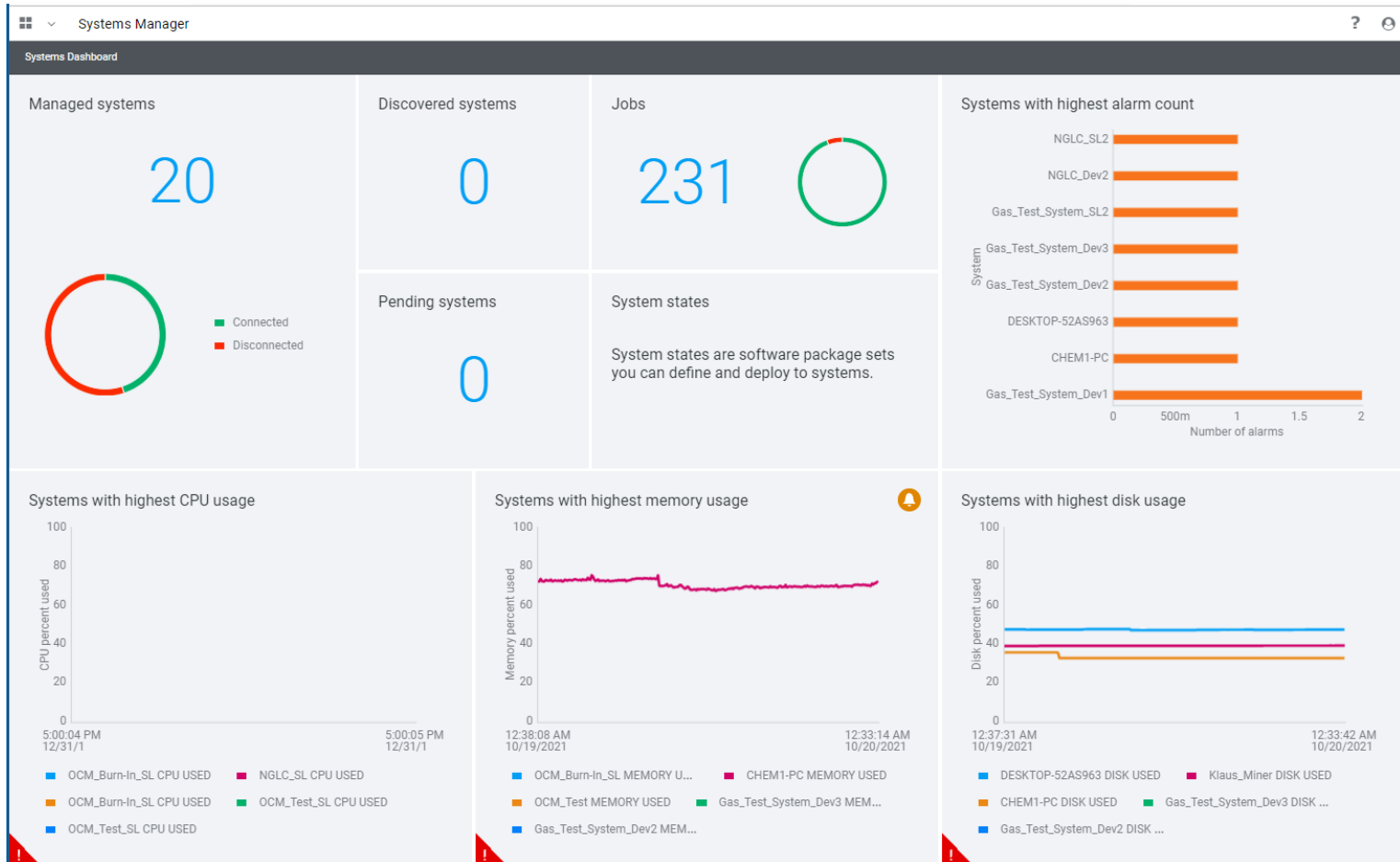
Delivery - LabVIEW



Delivery - TestStand



Have You Seen Junior's Grades?



SystemLink Server Workspaces

I don't always use SystemLink, but
when I do, I start with a Workspace



Security			?	⊗
Roles	Workspaces	Users	Search...	Create Workspace
Name	Archived		III	
Default	No		⋮	
Particle Measuring Systems-NGLC	No		⋮	
InstruTech-OCM-Burn-In	No		⋮	
InstruTech-OCM-Test	No		⋮	
Molecular Products-Gas Test System	No		⋮	
InstruTech-OCM-Test-Development	No		⋮	
InstruTech-OCM-Burn-In-Development	No		⋮	
Molecular Products-Gas Test System-Development	No		⋮	
Particle Measuring Systems-NGLC-Development	No		⋮	

SystemLink Server Workspace Roles

Security

Roles Workspaces Users

Name	Archived
Bolder Software	No
Default	No
InstruTech - OCM Burn-In	No
InstruTech - OCM Test	No
Molecular Products - Gas Test System	No
Particle Measuring Systems - NGLC	No

Edit workspace

Info [Role mappings](#)



Attribute	Value	Role	
LDAP User	benhoward	Systems Maintain	x
LDAP User	chasewilliams	Systems Maintain	x
LDAP User	John	Systems Maintain	x
LDAP User	samtaggart	Systems Maintain	x

+ MAPPING

CANCEL UPDATE










SystemLink Server

Package Repository Overview

 Package Repository ? 

Package Repository

Create | Replicate | Clone | Delete

	Feed Name ↑	Workspace	Description
	Bolder Software - Corporate	Default	
	Bolder Software - Developers	Default	
	InstruTech - OCM Burn-In	InstruTech - OCM Burn-In	
	InstruTech - OCM Test	Default	
	Molecular Products - Gas Test System	Molecular Products - Gas Test System	
	Particle Measuring Systems - NGLC	Particle Measuring Systems - NGLC	
	Particle Measuring Systems - NPC10	Default	
	Sundyne - HMP	Default	
	Sundyne - LMV	Default	

SystemLink Server

Package Repository Example

Package Repository

Package Repository > Molecular Products - Gas Test System

Save Revert Update Clean Clone Delete

Feed Name:

Molecular Products - Gas Test System

Workspace:


Molecular Products - Gas Test System

Platform:

Windows

Description:

Feed URL:

https://systemlink.boldersoftware.com/nirepo/v1/files/fe... 

Number of Packages:

361

Last Updated:

August 23, 2021 10:12:12 PM MDT

Packages

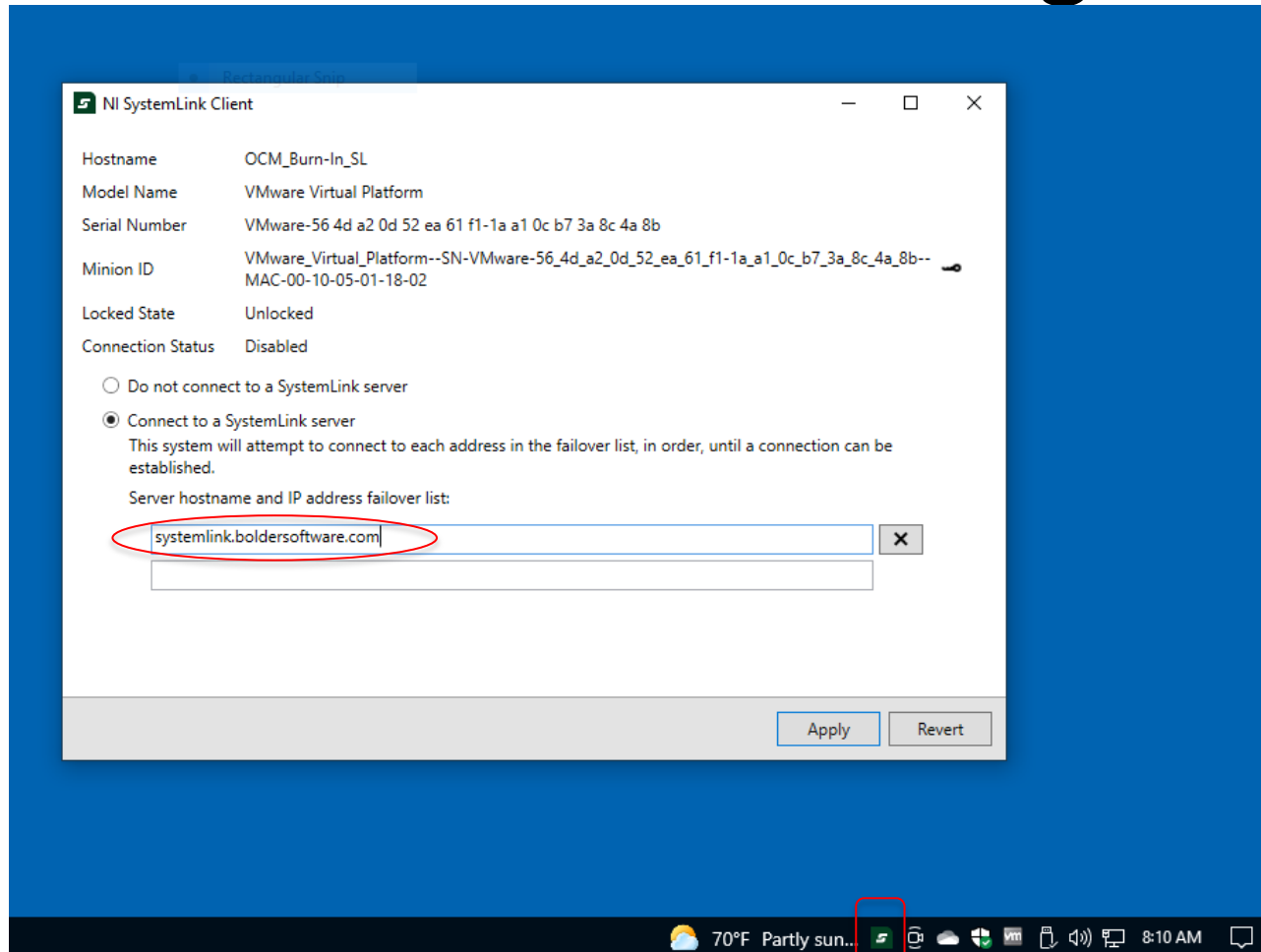
Add Delete Download Filter

<input type="checkbox"/>	Package Name ↑	Version	Architecture	Description
<input type="checkbox"/>	eula-ni-standard	20.0.0.49153-0+f1	windows_all	Package for displaying the NI Software License Agreement for
<input type="checkbox"/>	eula-ni-standard	20.6.0.49316-0+f164	windows_all	Package for displaying the NI Software License Agreement for
<input type="checkbox"/>	gas-test-system	3.2.0-0	windows_all	Gas Test System
<input type="checkbox"/>	ni-active-x-container	17.1.1.49152-0+f0	windows_all	NI ActiveX Container enables you to embed ActiveX objects on
<input type="checkbox"/>	ni-active-x-container	17.1.2.49152-0+f0	windows_all	NI ActiveX Container enables you to embed ActiveX objects on

SystemLink Server Managed Systems

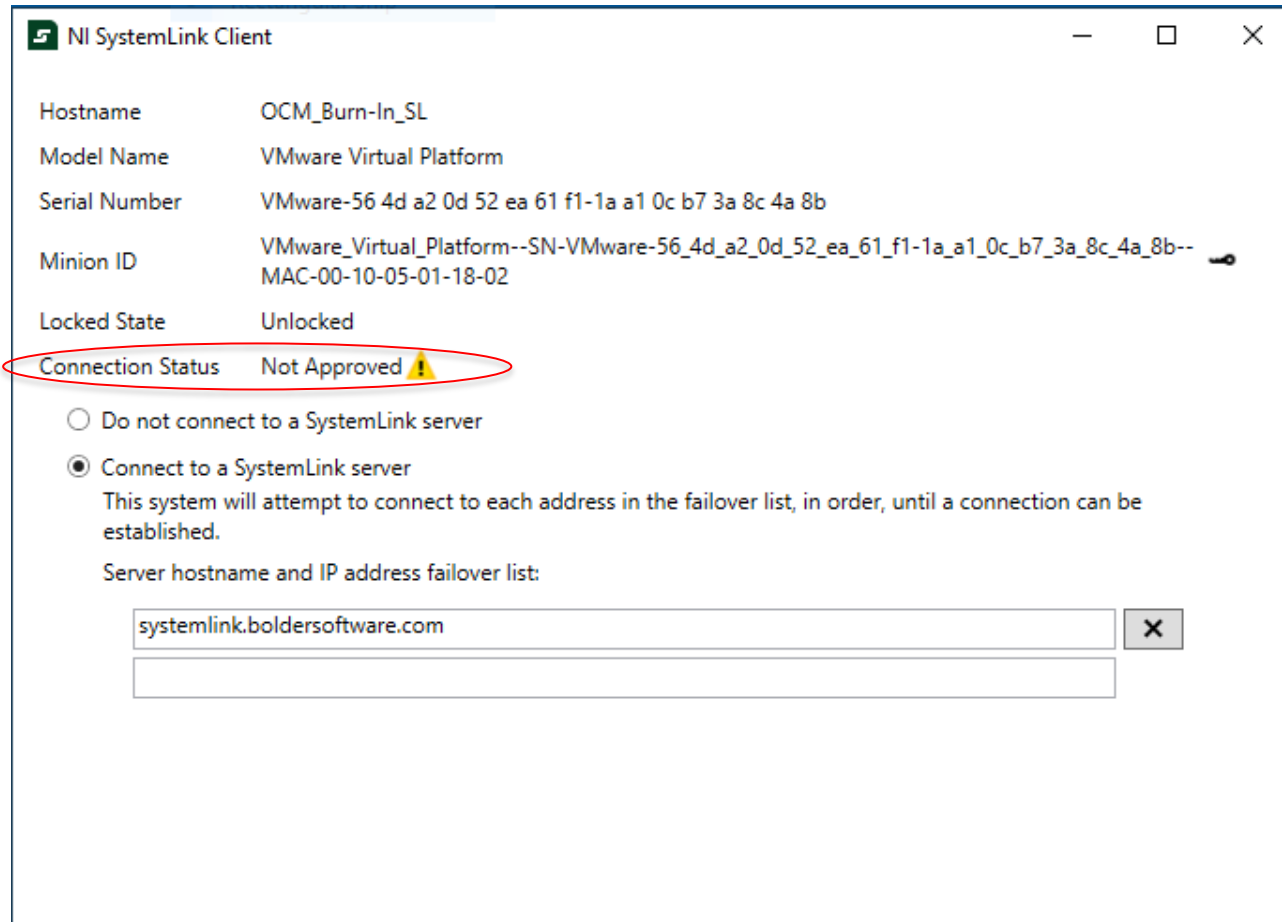
Systems Manager									
Systems Dashboard > Managed Systems									
Groups History Compare Software Restart Export to CSV More 20 of 20 systems Filter									
<input type="checkbox"/>	Name	Connection	Hostname	IP Address	MAC Address	Comments		Pending Status	
<input type="checkbox"/>	InstruTech-OCM-Burn-In (3)								
<input type="checkbox"/>	OCM_Burn-In_SL1	Disconnected	OCM_Burn-In_S	192.168.1.134	02:10:05:01:20:01				
<input type="checkbox"/>	OCM_Burn-In_SL2	Disconnected	OCM_Burn-In_S	192.168.1.133	02:10:05:01:20:02				
<input type="checkbox"/>	OCM_Burn-In_SL3	Disconnected	OCM_Burn-In_S	192.168.48.139	02:10:05:01:20:03				
<input type="checkbox"/>	InstruTech-OCM-Burn-In-Development (3)								
<input type="checkbox"/>	OCM_Burn-In_Dev1	Disconnected	OCM_Burn-In_C	192.168.1.238	00:10:05:01:20:01				
<input type="checkbox"/>	OCM_Burn-In_Dev2	Disconnected	OCM_Burn-In_C	192.168.1.239	00:10:05:01:20:02				
<input type="checkbox"/>	OCM_Burn-In_Dev3	Disconnected	OCM_Burn-In_C	192.168.48.138	00:10:05:01:20:03				
<input type="checkbox"/>	InstruTech-OCM-Test (1)								
<input type="checkbox"/>	OCM_Test_SL	Disconnected	OCM_Test_SL	192.168.1.122	00:10:05:02:20:01				
<input type="checkbox"/>	InstruTech-OCM-Test-Development (1)								
<input type="checkbox"/>	OCM_Test	Disconnected	OCM_Test	192.168.1.242	00:10:05:02:20:00				
<input type="checkbox"/>	Molecular Products-Gas Test System (3)								
<input type="checkbox"/>	CHEM1-PC	Connected	CHEM1-PC	10.25.0.193	00:05:1B:94:A2:48				
<input type="checkbox"/>	DESKTOP-52AS963	Connected	DESKTOP-52AS963	10.25.1.55	F8:75:A4:4C:9A:95				
<input type="checkbox"/>	Gas_Test_System_SL2	Disconnected	Gas_Test_System_SL2	192.168.1.183	02:10:08:01:20:02				
<input type="checkbox"/>	Molecular Products-Gas Test System-Development (3)								
<input type="checkbox"/>	Gas_Test_System_Dev1	Disconnected	Gas_Test_System_Dev1	192.168.1.208	00:10:08:01:20:01				
<input type="checkbox"/>	Gas_Test_System_Dev2	Disconnected	Gas_Test_System_Dev2	192.168.1.136	00:10:08:01:20:02				
<input type="checkbox"/>	Gas_Test_System_Dev3	Disconnected	Gas_Test_System_Dev3	192.168.48.135	00:10:08:01:20:03				
<input type="checkbox"/>	Particle Measuring Systems-NGLC (3)								
<input type="checkbox"/>	NGLC_SL1	Disconnected	NGLC_SL1	192.168.1.186	02:10:09:01:20:01				
<input type="checkbox"/>	NGLC_SL2	Disconnected	NGLC_SL2	192.168.1.187	02:10:09:01:20:02				
<input type="checkbox"/>	NGLC_SL3	Disconnected	NGLC_SL3	192.168.48.137	02:10:09:01:20:03				

SystemLink Client - Configuration




SystemLink Client Settings

SystemLink Client - Pending Approval



The screenshot shows the 'NI SystemLink Client' window. It displays system information and connection settings. The 'Connection Status' is highlighted with a red circle and shows 'Not Approved' with a yellow warning icon. Below this, there are radio buttons for connection preferences, with 'Connect to a SystemLink server' selected. A text box for the failover list contains 'systemlink.boldersoftware.com'.

Hostname	OCM_Burn-In_SL
Model Name	VMware Virtual Platform
Serial Number	VMware-56 4d a2 0d 52 ea 61 f1-1a a1 0c b7 3a 8c 4a 8b
Minion ID	VMware_Virtual_Platform--SN-VMware-56_4d_a2_0d_52_ea_61_f1-1a_a1_0c_b7_3a_8c_4a_8b-- MAC-00-10-05-01-18-02
Locked State	Unlocked
Connection Status	Not Approved 

☐ Do not connect to a SystemLink server


☒ Connect to a SystemLink server

This system will attempt to connect to each address in the failover list, in order, until a connection can be established.

Server hostname and IP address failover list:

SystemLink Client Pending Approval

SystemLink Client – Connected

 NI SystemLink Client— □ ×

Hostname	OCM_Burn-In_SL
Model Name	VMware Virtual Platform
Serial Number	VMware-56 4d a2 0d 52 ea 61 f1-1a a1 0c b7 3a 8c 4a 8b
Minion ID	VMware_Virtual_Platform--SN-VMware-56_4d_a2_0d_52_ea_61_f1-1a_a1_0c_b7_3a_8c_4a_8b-- MAC-00-10-05-01-18-02
Locked State	Unlocked
Connection Status	Connected

☐ Do not connect to a SystemLink server

☒ Connect to a SystemLink server

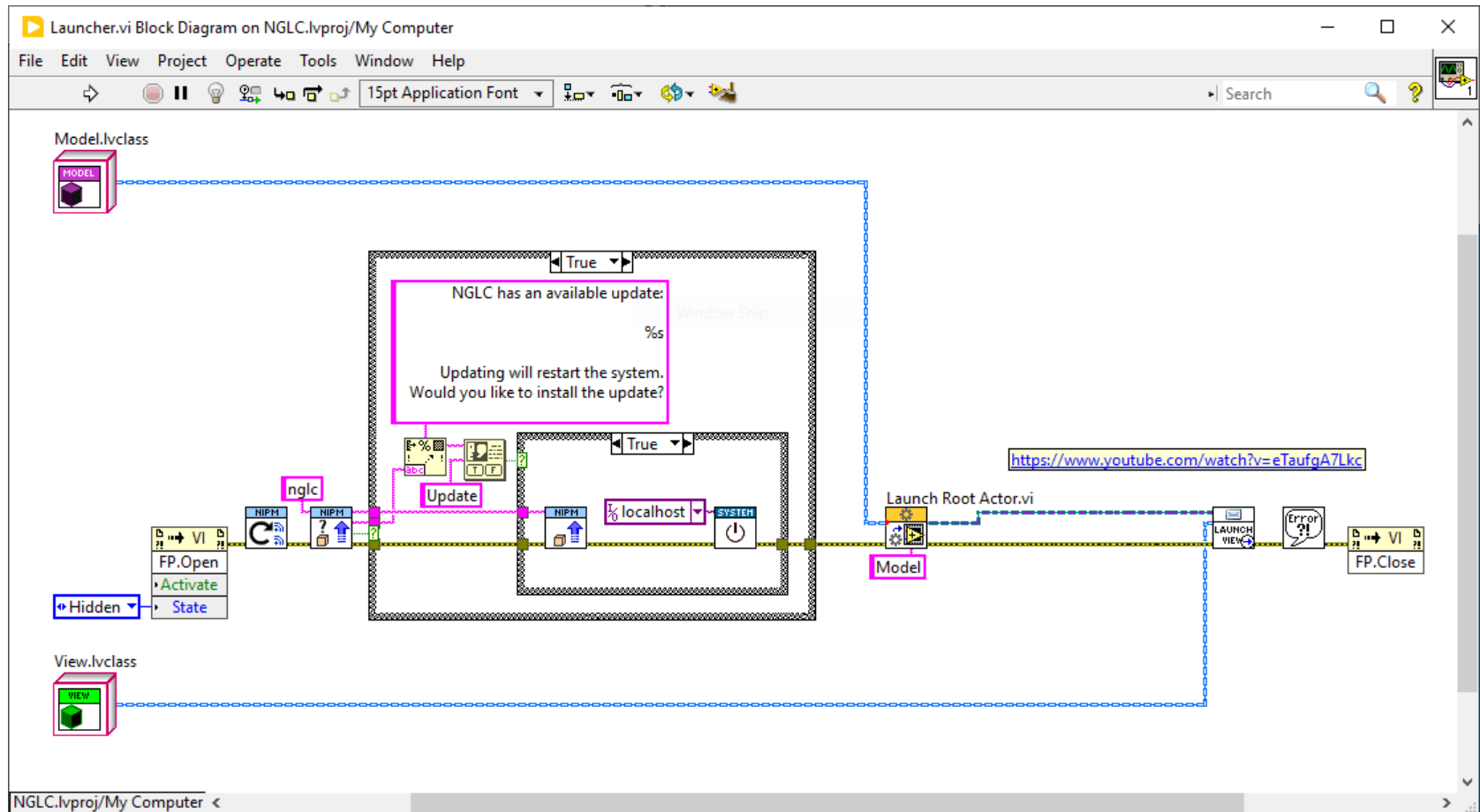
This system will attempt to connect to each address in the failover list, in order, until a connection can be established.

Server hostname and IP address failover list:

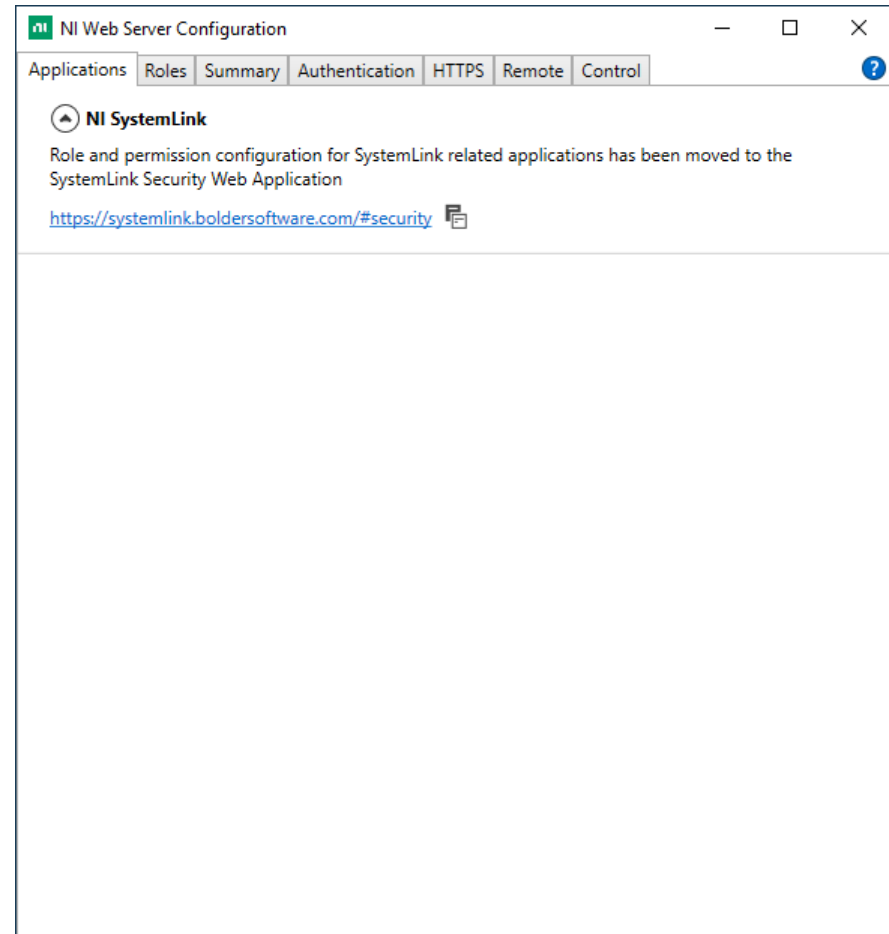
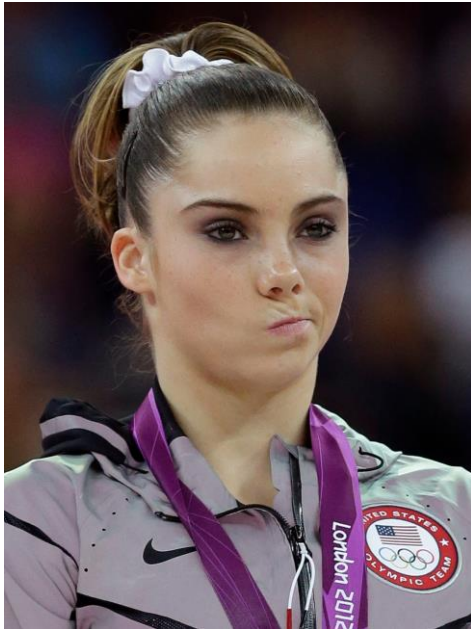
×

SystemLink Client Connected

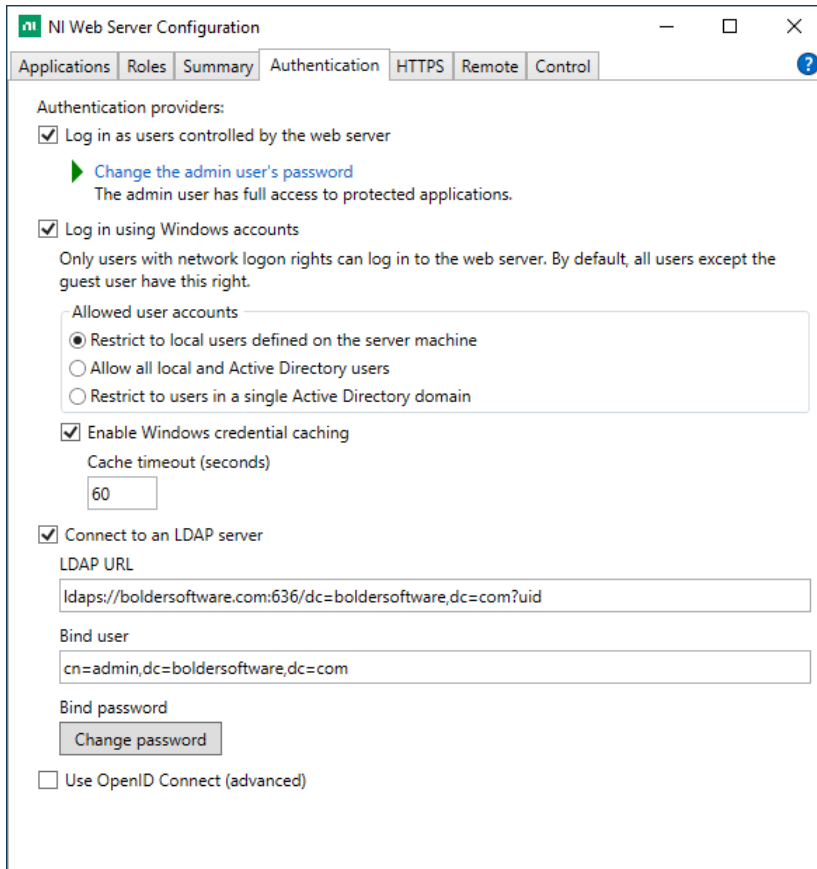
Automated Updates Using NIPM API



OK, But What About Security?



SystemLink Server

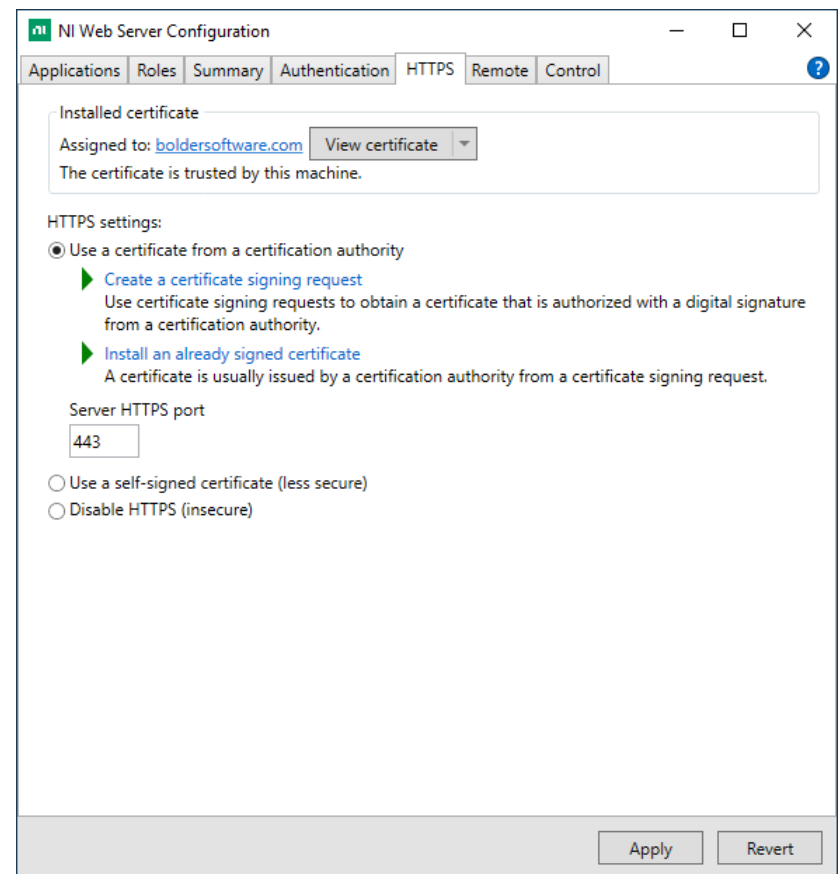


NI Web Server Configuration

Applications Roles Summary **Authentication** HTTPS Remote Control

Authentication providers:

- ☒ Log in as users controlled by the web server
 - [Change the admin user's password](#)
The admin user has full access to protected applications.
- ☒ Log in using Windows accounts
 - Only users with network logon rights can log in to the web server. By default, all users except the guest user have this right.
 - Allowed user accounts
 - ☒ Restrict to local users defined on the server machine
 - ☐ Allow all local and Active Directory users
 - ☐ Restrict to users in a single Active Directory domain
- ☒ Enable Windows credential caching
 - Cache timeout (seconds)
- ☒ Connect to an LDAP server
 - LDAP URL
 - Bind user
 - Bind password
- ☐ Use OpenID Connect (advanced)



NI Web Server Configuration

Applications Roles Summary Authentication **HTTPS** Remote Control

Installed certificate

Assigned to: [boldersoftware.com](#)

The certificate is trusted by this machine.


HTTPS settings:

- ☒ Use a certificate from a certification authority
 - [Create a certificate signing request](#)
Use certificate signing requests to obtain a certificate that is authorized with a digital signature from a certification authority.
 - [Install an already signed certificate](#)
A certificate is usually issued by a certification authority from a certificate signing request.
- ☐ Use a self-signed certificate (less secure)
- ☐ Disable HTTPS (insecure)

Server HTTPS port

NI Web Server Configuration

SystemLink Server - LDAP



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The Free Encyclopedia

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Lightweight Directory Access Protocol

From Wikipedia, the free encyclopedia

The **Lightweight Directory Access Protocol** (**LDAP** /ˈɛldæp/) is an open, vendor-neutral, industry standard [application protocol](#) for accessing and maintaining distributed [directory information services](#) over an [Internet Protocol](#) (IP) network.^[1] [Directory services](#) play an important role in developing [intranet](#) and Internet applications by allowing the sharing of information about users, systems, networks, services, and applications throughout the network.^[2] As examples, directory services may provide any organized set of records, often with a hierarchical structure, such as a corporate [email directory](#). Similarly, a [telephone directory](#) is a list of subscribers with an address and a phone number.

LDAP is specified in a series of [Internet Engineering Task Force](#) (IETF) Standard Track publications called [Request for Comments](#) (RFCs), using the description language [ASN.1](#). The latest specification is Version 3, published as [RFC 4511](#)^[3] (a road map to the technical specifications is provided by [RFC4510](#)^[4]).

A common use of LDAP is to provide a central place to store usernames and passwords. This allows many different applications and services to connect to the LDAP server to validate users.^[4]

LDAP is based on a simpler subset of the standards contained within the [X.500](#) standard. Because of this relationship, LDAP is sometimes called [X.500-lite](#).^[5]

Internet protocol suite

Application layer
BGP · DHCP(v6) · DNS · FTP · HTTP · HTTPS · IMAP · **LDAP** · MGCP · MQTT · NNTP · NTP · POP · PTP · ONC/RPC · RTP · RTSP · RIP · SIP · SMTP · SNMP · SSH · Telnet · TLS/SSL · XMPP · [more...](#)

Transport layer
TCP · UDP · DCCP · SCTP · RSVP · [more...](#)

Internet layer
IP (IPv4 · IPv6) · ICMP(v6) · ECN · IGMP · IPsec · [more...](#)

Link layer
ARP · NDP · OSPF · Tunnels (L2TP) · PPP · MAC (Ethernet · Wi-Fi · DSL · ISDN · FDDI) · [more...](#)

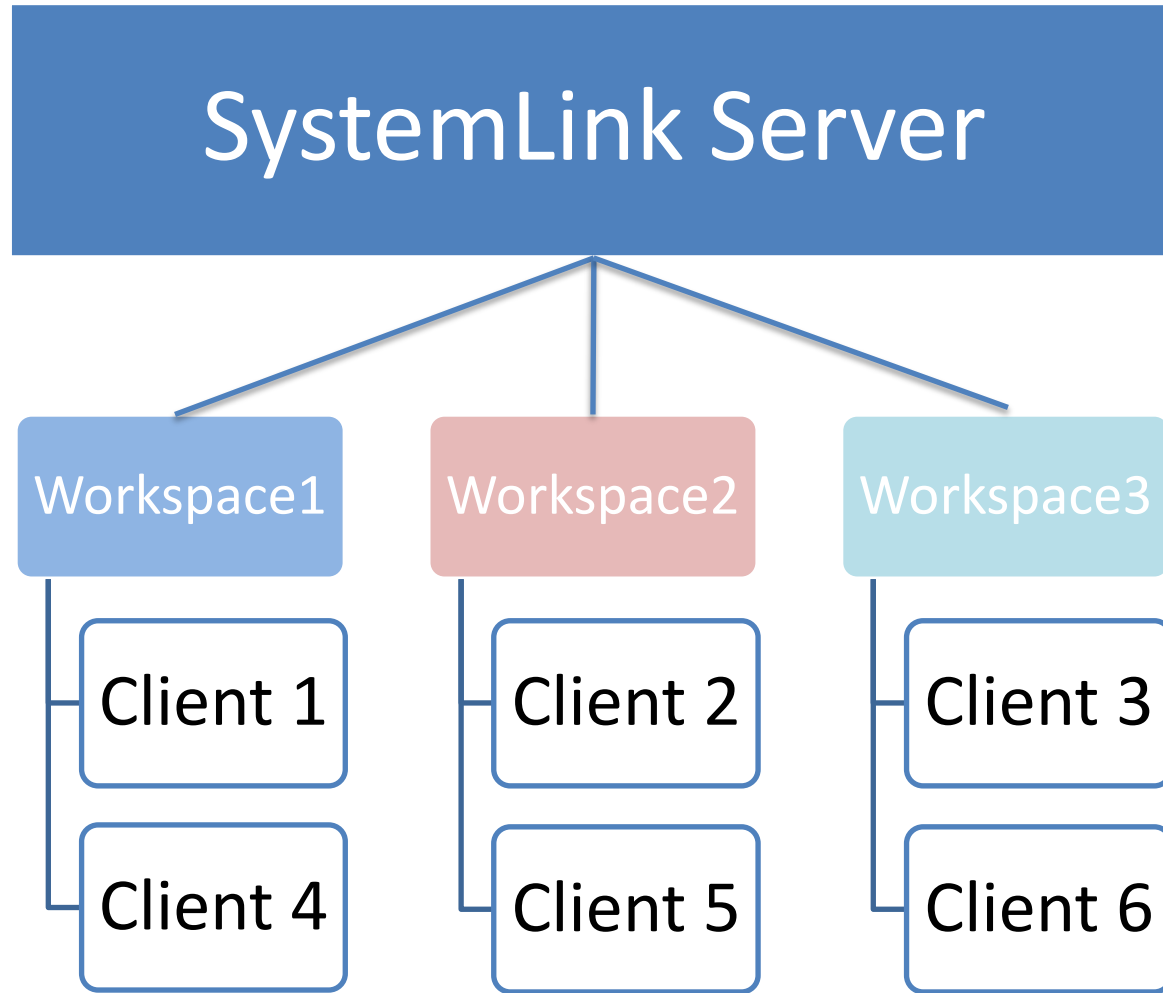
V · T · E

Contents [hide]

- History
- Protocol overview
- Directory structure
- Operations
- 4.1 Add

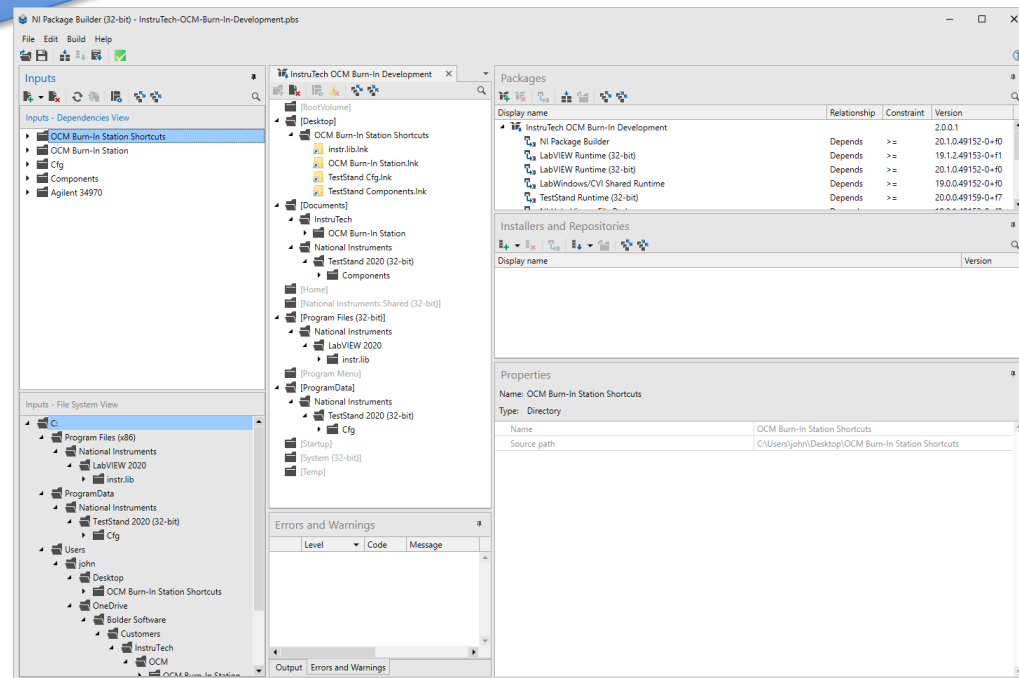
LDAP

SystemLink Client and Server



Replicating Development Environments

Let's try building a package to replicate development environments!



Replicating Development Environments



← → ↻ 🏠 🔒 <https://boldersoftware.com/redmine/documents/260>

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InstruTech » OCM » **Burn-In Station** 🔍 Search:

Overview Activity Roadmap Issues Spent time Gantt WorkTime Calendar Documents Files Repository Settings

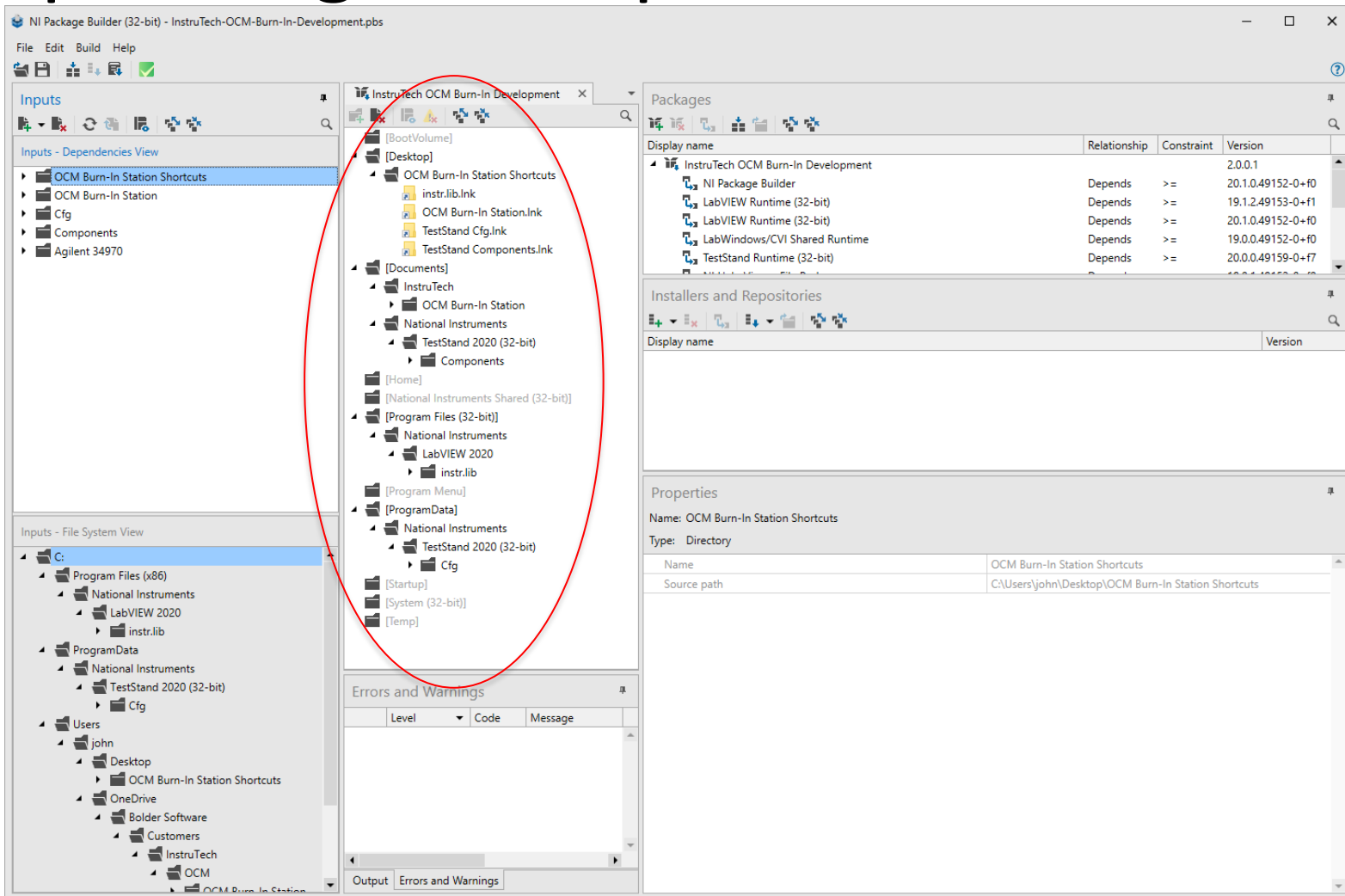
Repository Map

User documentation
09/02/2021

Repository	URL	Checkout Folder
Burn-In Station	https://git.boldersoftware.com/InstruTech/OCM/Burn-In_Station	<Public>\InstruTech\OCM Burn-In Station
instr.lib		
Agilent 34970	https://git.boldersoftware.com/InstruTech/OCM/Burn-In_Station_instr.lib/Agilent_34970	<instr.lib>\Agilent 34970
TestStand		
<TestStand Cfg>	https://git.boldersoftware.com/InstruTech/OCM/Burn-In_Station_TestStand_Cfg	<ProgramData>\National Instruments\TestStand 2017 (32-bit)\Cfg
<TestStand Components>	https://git.boldersoftware.com/InstruTech/OCM/Burn-In_Station_TestStand_Components	<Public>\National Instruments\TestStand 2017 (32-bit)\Components

Files
New file

Replicating Development Environments



Replicating Development Environments

```
nipkg.ini - Notepad
File Edit Format View Help
[nipkg.repo.ni-labview-2020-core-x86-en-2020 sp1-released]
configurable=true
enabled=true
name=ni-labview-2020-core-x86-en-2020 SP1-released
ni-managed=true
uri=https://download.ni.com/support/nipkg/products/ni-l/ni-labview-2020-x86/20.1/released

[nipkg.repo.ni-labview-2020-core-x86-en-2020 sp1-released-critical]
configurable=true
enabled=true
name=ni-labview-2020-core-x86-en-2020 SP1-released-critical
ni-managed=true
update-service-severity=critical
uri=https://download.ni.com/support/nipkg/products/ni-l/ni-labview-2020-x86/20.1/released-critical

[nipkg.repo.ni-teststand-2020-x86-2020-released]
configurable=true
enabled=true
name=ni-teststand-2020-x86-2020-released
ni-managed=true
uri=https://download.ni.com/support/nipkg/products/ni-t/ni-teststand-2020-x86/20.0/released

[nipkg.repo.ni-488-2-20-0-released]
configurable=true
enabled=true
name=ni-488-2-20-0-released
ni-managed=true
uri=https://download.ni.com/support/nipkg/products/ni-4/ni-488.2/20.0/released

[nipkg.repo.ni-teststand-2020-x86-2020-released-critical]
configurable=true
enabled=true
name=ni-teststand-2020-x86-2020-released-critical
ni-managed=true
uri=https://download.ni.com/support/nipkg/products/ni-t/ni-teststand-2020-x86/20.0/released-critical
```

```
Installed-Package-Feeds-Parsed.ini - Notepad
File Edit Format View Help
https://download.ni.com/support/nipkg/products/ni-l/ni-labview-2020-x86/20.1/released
https://download.ni.com/support/nipkg/products/ni-l/ni-labview-2020-x86/20.1/released-critical
https://download.ni.com/support/nipkg/products/ni-t/ni-teststand-2020-x86/20.0/released
https://download.ni.com/support/nipkg/products/ni-4/ni-488.2/20.0/released
https://download.ni.com/support/nipkg/products/ni-t/ni-teststand-2020-x86/20.0/released-critical
https://download.ni.com/support/nipkg/products/ni-4/ni-488.2/20.0/released-critical
https://download.ni.com/support/nipkg/products/ni-v/ni-visa/20.0/released-critical
https://download.ni.com/support/nipkg/products/ni-v/ni-visa/20.0/released
https://download.ni.com/support/nipkg/products/ni-v/ni-vipm/20.1/released
https://download.ni.com/support/nipkg/products/ni-v/ni-vipm/20.1/released-critical
https://download.ni.com/support/nipkg/products/ni-l/ni-license-manager/4.7/released
https://download.ni.com/support/nipkg/products/ni-l/ni-license-manager/4.7/released-critical
https://download.ni.com/support/nipkg/products/ni-l/ni-labview-2019-runtime-engine-x86/19.1/released
https://download.ni.com/support/nipkg/products/ni-l/ni-labview-2019-runtime-engine-x86/19.1/released-critical
https://download.ni.com/support/nipkg/products/ni-u/ni-update-service/19.0/released
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https://download.ni.com/support/nipkg/products/ni-l/ni-labview-2020-runtime-engine-x86/20.1/released
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https://download.ni.com/support/nipkg/products/ni-p/ni-package-builder/20.1/released
https://download.ni.com/support/nipkg/products/ni-p/ni-package-builder/20.1/released-critical
https://download.ni.com/support/nipkg/products/ni-c/ni-cvi-runtime-engine/19.0/released
https://download.ni.com/support/nipkg/products/ni-c/ni-cvi-runtime-engine/19.0/released-critical
https://download.ni.com/support/nipkg/products/ni-d/ni-distributed-system-manager-2020/20.0/released
https://download.ni.com/support/nipkg/products/ni-d/ni-distributed-system-manager-2020/20.0/released-critical
```

Welcome to Boulder!

I grew up in Colorado and have lived here most of my life. Let me know if you have any questions about activities, dining, places of interest, etc. I'd be happy to share what I know!

